

Patent claims:

1. A process for the preparation of alkylated N- or amino, ammonium or spirobicyclic or ammonium group-containing, crosslinked polymer gels, wherein
  - a) in the crosslinkage step an aqueous solution of a polymer obtained by polymerization of the corresponding monomer is adjusted to a pH of 7.5-14 at a temperature of 0 to 90°C, then the appropriate crosslinking agent is metered in and precrosslinkage is carried out with stirring and the precrosslinked polymer is transferred for complete curing to a curing container, whereupon
  - b) the cured crude gel is cut into a defined shape, then
  - c) washed with methanol batchwise in a static or stirred bed and directly following this
  - d) in methanol, the alkylation is carried out by addition of one or more alkylators at a temperature from 5 to 90°C and a pressure from 1 to 3 bar, addition of a base and optionally reprotonation, after which the alkylated gel
  - e) is first washed batchwise by means of methanol/NaCl washes in a static or stirred bed or continuously, then
  - f) batchwise by means of NaCl washes and final water washes with deionized water in a static or stirred bed or continuously.
2. The process as claimed in claim 1, wherein in the crosslinkage in step a) the aqueous polymer solution is first adjusted to a pH of 9.5 to 10.6 in a mixing reactor at a temperature from 5 to 30°C, and then this reaction mixture is transferred to a gelling reactor and a crosslinking agent is added, whereupon the reaction mixture is precrosslinked for 10 to

120 minutes with stirring and then transferred to a curing container for complete curing.

- 5        3.    The process as claimed in claim 1, wherein in the alkylation in step d) in each case the mixture is stirred only during and shortly after introduction of the reagents.
- 10       4.    The process as claimed in claim 1, wherein the crude gel washes in step c) and/or the methanol/sodium chloride washes in step e) are carried out in a stirring vessel or in a stirred suction filter, the solvent supply taking place from the bottom of the stirring vessel or the  
15       stirred suction filter or via the top in the stirring vessel or in the stirred suction filter and the aspiration of the used wash medium taking place via a dip tube.
- 20       5.    The process as claimed in claim 1, wherein the methanol/sodium chloride washes in step e) are carried out in a continuously operated wash column or in a wash tower or in a stirring vessel, the gel cake being present after filtration of the gel  
25       suspension as a static or stirred bed and the supply of methanol/sodium chloride solution taking place from the bottom and the aspiration taking place via a dip tube.
- 30       6.    The process as claimed in claim 1, wherein the sodium chloride washes and/or the water washes in step f) are carried out by spraying the gel bed with the washing solution or by suspension washes in a stirred suction filter or in a stirring  
35       vessel or in a continuously operated wash column.
7.    The process as claimed in claim 1, wherein in the alkylation in step d) haloalkylammonium salts are

employed as alkylators, optionally in combination with bromodecane.

- 5           8.    The process as claimed in claim 7, wherein in step  
            d) haloalkylammonium salts, prepared by reaction  
            of trimethylamine and a dihalo-C<sub>3</sub>-C<sub>24</sub>-alkane in  
            ethyl acetate at a temperature from -15 to 100°C  
            and at a pressure from 1 to 10 bar, subsequent  
10           cooling, filtration and drying, are employed as an  
            alkylator, optionally in combination with  
            bromodecane.
9.    A process for the preparation of haloalkylammonium  
            salts, which comprises reacting trimethylamine and  
15           a dihalo-C<sub>3</sub>-C<sub>24</sub>-alkane in ethyl acetate at a  
            temperature from -15 to 100°C and at a pressure  
            from 1 to 10 bar, whereupon the reaction mixture  
            is cooled after 5 to 15 hours and filtered and the  
            haloalkylammonium salt thus obtained is dried.  
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10.   The process as claimed in claim 1, wherein for the  
            alkylation in step d) the alkylator employed is  
            6-bromohexyltrimethylammonium bromide, prepared as  
            claimed in claim 9, optionally in combination with  
25           bromodecane.
11.   A process for the preparation of alkylated N- or  
            amino, ammonium or spirobicyclic or ammonium  
            group-containing, crosslinked polymer gels, which  
30           comprises washing a gelled and cut crude gel  
            obtained by polymerization and crosslinkage  
            a) in a stirring vessel or in a stirred suction  
            filter with methanol, the solvent supply taking  
            place from the bottom of the stirring vessel or  
35           the stirred suction filter or via the top in  
            the stirring vessel or in the stirred suction  
            filter and the aspiration of the used wash  
            medium taking place via a dip tube and

- b) the crude gel washed in this way being alkylated with an alkylator following this, whereupon
- 5 c) a methanol/sodium chloride wash is carried out in a continuously operated wash column or in a wash tower or stirring vessel, the gel cake being present after filtration of the gel suspension as a static or stirred bed and the supply of methanol/sodium chloride solution
- 10 taking place from the bottom and the aspiration taking place via a dip tube, and then
- 15 d) a sodium chloride wash and a water wash is carried out by spraying the gel bed with the washing solution or by suspension washes in a stirred suction filter or in a stirring vessel or in a continuously operated wash column.

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[Signature]  
DSM Fine Chemicals Austria Nfg GmbH  
& Co KG